

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application.

Listing of the Claims

Claim 1. (withdrawn) An apparatus for coating a plurality of semiconductor devices, comprising:

a mold housing comprising a formation cavity arranged to hold semiconductor devices, said formation cavity further arranged so that a coating material can be introduced into said formation cavity, said coating material at least partially covering said semiconductor devices.

Claim 2. (withdrawn) The apparatus of claim 1, wherein formation cavity is arranged such that said coating material is introduced by injection into said formation cavity.

Claim 3. (withdrawn) The apparatus of claim 1, wherein said formation cavity is arranged such that the coating material substantial fills said formation cavity.

Claim 4. (withdrawn) The apparatus of claim 1, wherein said mold housing comprises a bottom rigid block support and a top rigid block support arranged over said bottom rigid block support with a space between the two to at least partially define said formation cavity.

Claim 5. (withdrawn) The apparatus of claim 1, wherein said semiconductor devices comprise light emitting diodes (LEDs).

Claim 6. (withdrawn) The apparatus of claim 1, wherein said coating material comprises light conversion particles distributed in a curable epoxy, silicone or other polymer.

Claim 7. (withdrawn) The apparatus of claim 4, wherein said semiconductor devices are positioned on said top surface of said bottom block support, within said formation cavity.

Claim 8. (withdrawn) The apparatus of claim 4, further comprising a first double sided adhesive film on the top surface of said bottom rigid block support and a second double sided adhesive film on the bottom surface of said top rigid block support, said semiconductor devices arranged on said first or second adhesive films.

Claim 9. (withdrawn) The apparatus of claim 8, wherein said first and second double sided adhesive films do not bond to said curable coating material.

Claim 10. (withdrawn) The apparatus of claim 1, further comprising a spacer between said bottom and top rigid block supports to maintain the space between the two.

Claim 11. (withdrawn) The apparatus of claim 1, wherein said mold is arranged so that said curable coating material can be cured or otherwise hardened in said formation cavity, at least partially embedding said semiconductor devices in said coating material.

Claim 12. (withdrawn) The apparatus of claim 11, wherein said mold is arranged so that said cured or hardened coating material with embedded semiconductor devices can be removed from said formation cavity and said semiconductor devices separated with a layer of coating material remaining on each of said semiconductor devices.

Claim 13. (currently amended) A method for coating a plurality of semiconductor devices, comprising:

providing a mold with a formation cavity for holding a plurality of semiconductor devices, said formation cavity at least partially defined by opposing rigid upper and lower sections of said mold;

mounting a plurality of semiconductor devices within said mold formation cavity to at least one of said upper and lower sections with a film between said semiconductor devices and said upper and lower sections, each of said semiconductor devices being separately mounted in a pattern ~~mounted separately~~ within said formation cavity;

injecting or otherwise introducing curable coating material into said mold to fill said mold formation cavity and at least partially covering said semiconductor devices and contacting said film;

curing or otherwise treating said coating material so that said semiconductor devices are at least partially embedded in said cured coating material; and

removing said cured or treated coating material with said embedded semiconductor devices from said formation cavity by releasing said film and said upper and lower section from said coating material and said semiconductor devices leaving said

coating material uncovered.

Claim 14. (canceled)

Claim 15. (previously presented) The method of claim 13, further comprising separating said embedded semiconductor devices so that each is at least partially covered by a layer of said cured or treated coating material.

Claim 16. (previously presented) The method of claim 13, wherein said upper and lower sections provide opposing parallel surfaces, said semiconductor devices arranged on one or both of said opposing parallel surfaces.

Claim 17. (currently amended) The method of claim 13, wherein said curing or otherwise treating said ~~semiconductor~~ coating material comprises one of the methods from the group comprising heat curing, optical curing or room temperature curing.

Claim 18. (original) The method of claim 15, wherein said semiconductor devices are separated by dicing or scribe and break.

Claim 19. (original) The method of claim 15, wherein the said semiconductor devices are separated such that said layer of cured or otherwise treated coating material conforms to the shape of said semiconductor device.

Claim 20. (withdrawn) An apparatus for coating light emitting diodes (LEDs), comprising:

a mold housing comprising a formation cavity arranged to hold a plurality of LEDs, said formation cavity comprising at least a top and bottom surface, said LEDs arranged on said bottom or top surface, said mold housing arranged so that a matrix material can be introduced into said formation cavity at least partially covering said LEDs.

Claim 21. (withdrawn) The apparatus of claim 20, wherein said formation cavity is arranged so that said matrix material can be injected into said formation cavity.

Claim 22. (withdrawn) The apparatus of claim 20, wherein said matrix material substantially fills said formation cavity.

Claim 23. (withdrawn) The apparatus of claim 20, further comprising a bottom rigid block support and a top rigid block support arranged over said bottom rigid block support with a space between the two, the bottom of said top block support being said top surface of said formation cavity and the top of said bottom block support being said bottom surface of said formation cavity.

Claim 24. (withdrawn) The apparatus of claim 20, wherein said matrix material comprises curable material with uniformly distributed light conversion particles.

Claim 25. (withdrawn) The apparatus of claim 24, wherein said curable material is an epoxy or silicone.

Claim 26. (withdrawn) The apparatus of claim 20, wherein said

matrix material comprises phosphor light conversion particles.

Claim 27. (withdrawn) The apparatus of claim 20, further comprising a first double sided adhesive film on said top surface and a second double sided adhesive film on said bottom surface.

Claim 28. (withdrawn) The apparatus of claim 20, further comprising a spacer between said bottom and top rigid block supports to maintain the space between the two.

Claim 29. (withdrawn) The apparatus of claim 20, wherein said mold is arranged so that said curable coating material can be cured to at least partially embed said semiconductor devices in said cured coating material.

Claim 30. (withdrawn) The apparatus of claim 20, wherein said mold is arranged so that said cured coating material with embedded semiconductor devices can be removed from said formation cavity and said semiconductor devices separated with a layer of cured coating material.

Claim 31. (withdrawn) The apparatus of claim 20, wherein said LEDs each have a first contact on their bottom surface and a second contact on their top surface, said LEDs arranged on said formation cavity bottom surface and said formation cavity top surface on said LEDs' second contact.

Claim 32. (withdrawn) The apparatus of claim 20, further comprising a low tack adhesive sandwiched between each of the

LEDs and the said top or bottom surface upon which they are mounted, said low tack adhesive reducing underflow of said matrix material.

Claim 33. (withdrawn) A method for coating a plurality of light emitting diodes (LEDs), comprising:

providing a mold with a formation cavity for holding a plurality of semiconductor devices, said formation cavity at least partially defined by opposing upper and lower sections;

mounting a plurality of LEDs within said mold formation cavity sandwiched between said upper and lower sections, with a film between said LEDs and said upper and lower sections, each of said LEDs having contacts and being mounted separately within said formation cavity with one of said contacts covered by said film;

injecting or otherwise introducing a curable matrix material into said mold to fill said formation cavity, said curable matrix in contact with said upper and lower sections, and at least partially covering said LEDs, and leaving said film covered contacts uncovered by said matrix;

curing said matrix material so that said LEDs are at least partially embedded in said matrix material; and

removing said cured matrix material and said embedded LEDs from said formation cavity by detaching said upper and lower sections from said matrix material and said embedded LEDs, leaving said matrix substantially uncovered and said contact uncovered by said matrix material accessible for electrical connection; and

separating said embedded LEDs so that each is at least partially covered by a layer of said cured matrix material.

Claim 34. (canceled)

Claim 35. (withdrawn) The method of claim 33, wherein said matrix material contains light conversion particles.

Claim 36. (withdrawn) The method of claim 33, wherein said upper and lower sections provide opposing parallel surfaces, said LEDs arranged on one or both of said opposing parallel surfaces.

Claim 37. (withdrawn) The method of claim 33, wherein said curable matrix material is cured by one of the methods from the group comprising heat curing, optical curing or room temperature curing.

Claim 38. (withdrawn) A method for coating a plurality of semiconductor chips, comprising:

providing a mold with a formation cavity for holding a plurality of semiconductor chips, said formation cavity at least partially defined by opposing upper and lower sections;

mounting a plurality of semiconductor chips within said mold formation cavity directly to at least one of said upper and lower sections, each of said semiconductor chips being mounted separately within said formation cavity;

injecting or otherwise introducing curable coating material into said mold to fill said mold formation cavity and at least partially covering said semiconductor chips and said upper and lower sections;

curing or otherwise treating said coating material so that said semiconductor chips are at least partially embedded in said

cured coating material forming a sheet of semiconductor chips and coating material;

removing said sheet from said formation cavity such that said sheet is separated from both said upper and lower sections, leaving said coating material uncovered; and

separating said sheet into said individual semiconductor chips.

Claim 39. (withdrawn) The method of claim 38, wherein said coating material comprises curable material with uniformly distributed light conversion particles.

Claim 40. (withdrawn) The method of claim 39, wherein said curable material is an epoxy or silicone.

Claim 41. (withdrawn) The method of claim 38, wherein said coating material comprises phosphor light conversion particles.

Claim 42. (previously presented) The method of claim 13, wherein said plurality of semiconductor devices comprises light emitting diodes (LEDs).

Claim 43. (previously presented) The method of claim 42, wherein said curable coating material comprises a matrix material containing light conversion particles.

Claim 44. (previously presented) The method of claim 13, said plurality of semiconductor devices comprising contacts with one of said contacts covered by said film.

Serial No. 10/666,399
Filed September 18, 2003

Reply to Final Office Action dated September 5, 2008

Claim 45. (previously presented) The method of claim 44, wherein said removing of said cured or treated coating material leaves said contacts uncovered by said coating material.